

Slice Shear Force

Steven D. Shackelford, Tommy L. Wheeler,
and Mohammad Koohmaraie

USDA-ARS U.S. Meat Animal Research
Center

History of slice shear force

- Tenderness classification
- Tool for routine measurement of longissimus tenderness
- Potential tool for use on other muscles?

Tenderness classification

2420

SHACKELFORD ET AL.

Overall Success = 84.8%

n = 400

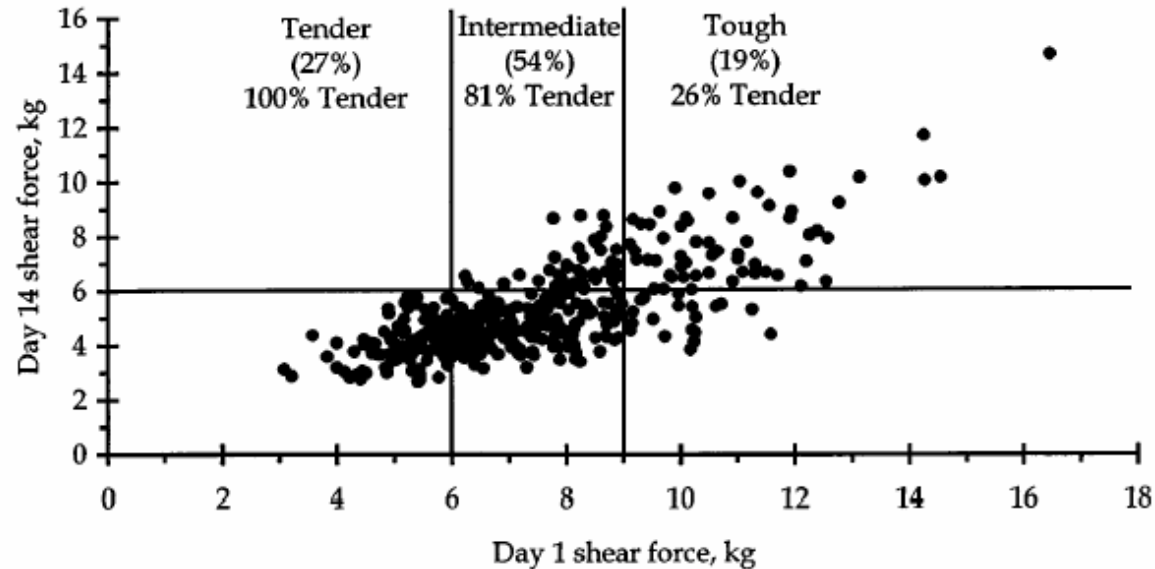
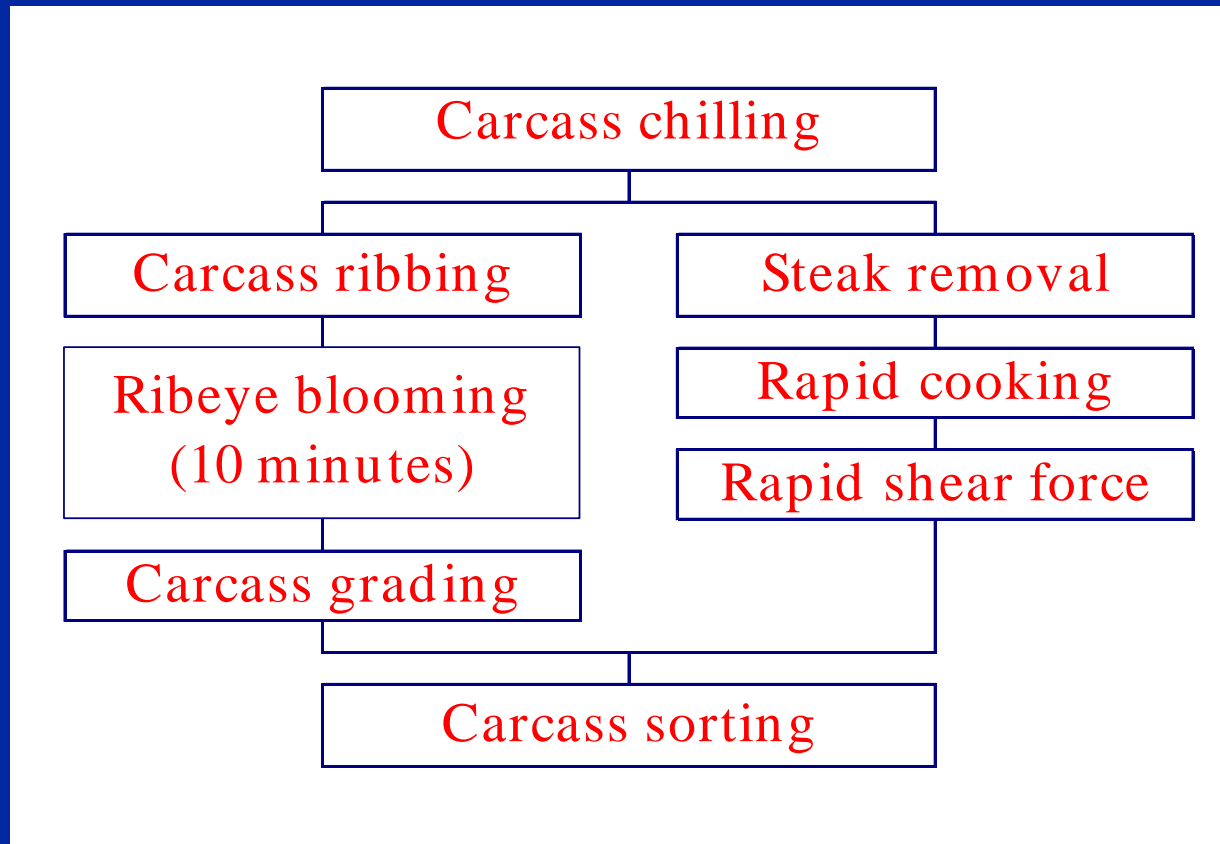


Figure 1. Tenderness classification of laboratory-slaughtered beef carcasses (Exp. 1). Parenthetical values indicate the percentage of carcasses in each tenderness class.

Tenderness classification



Develop of a method to automate the
process of removing 1 cm diameter cores
from a longissimus steak



Develop of a method to automate the process of removing 1 cm diameter cores from a longissimus steak

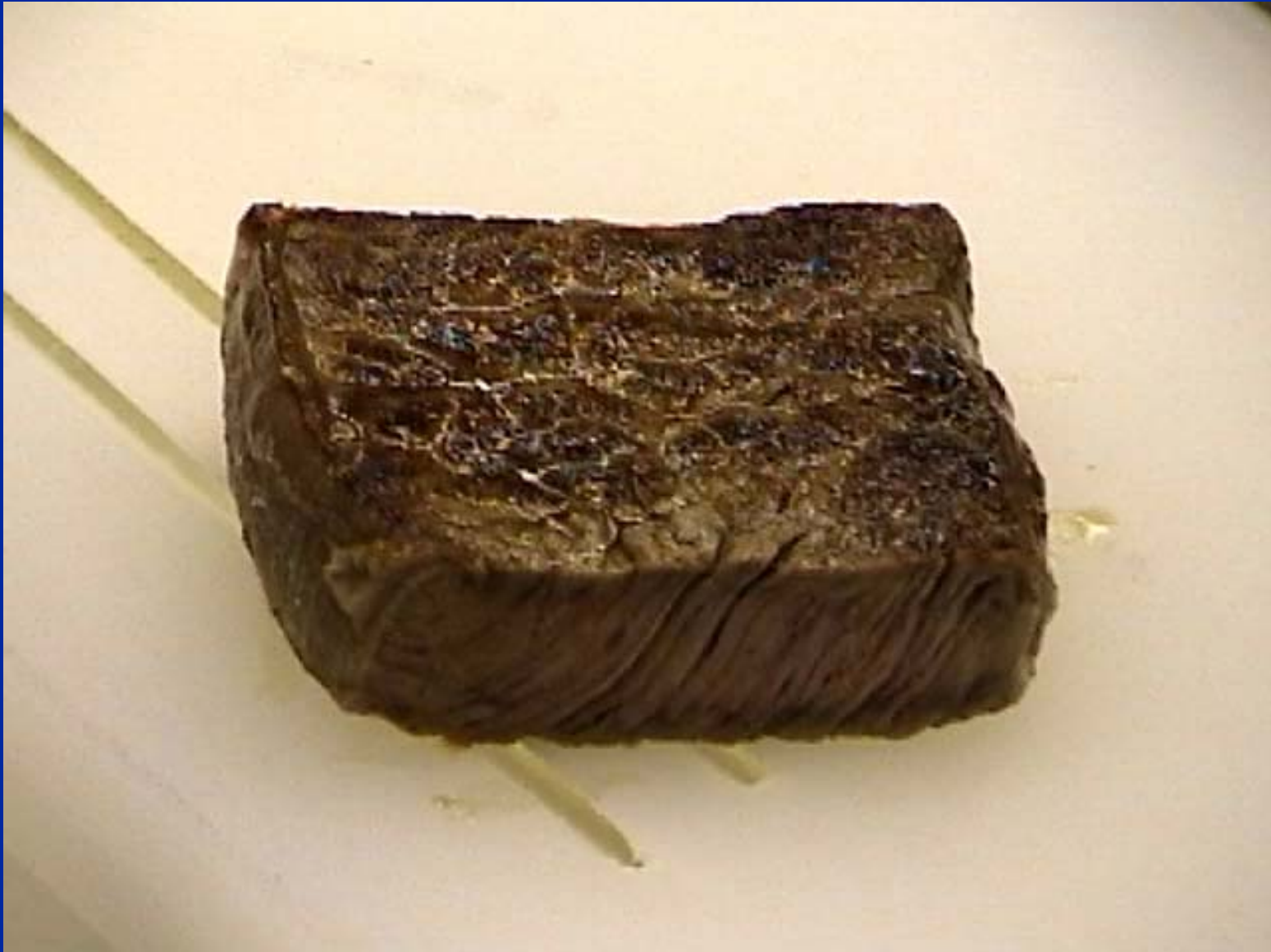
- No feasible solution

We concluded that the best we could do was obtain a single slice from each steak.

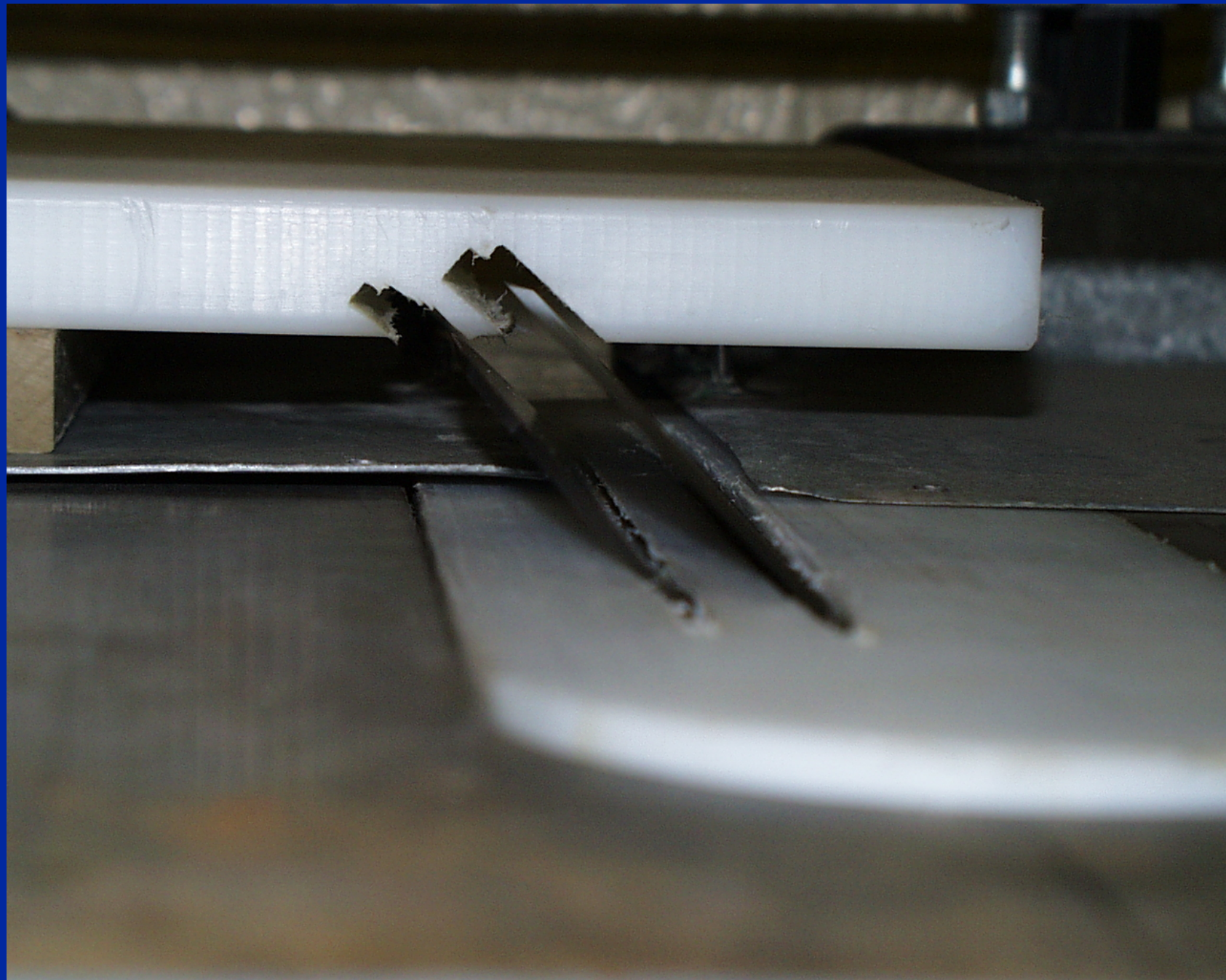
- The dimensions of that slice would be limited by ribeye size and



Fiber angle









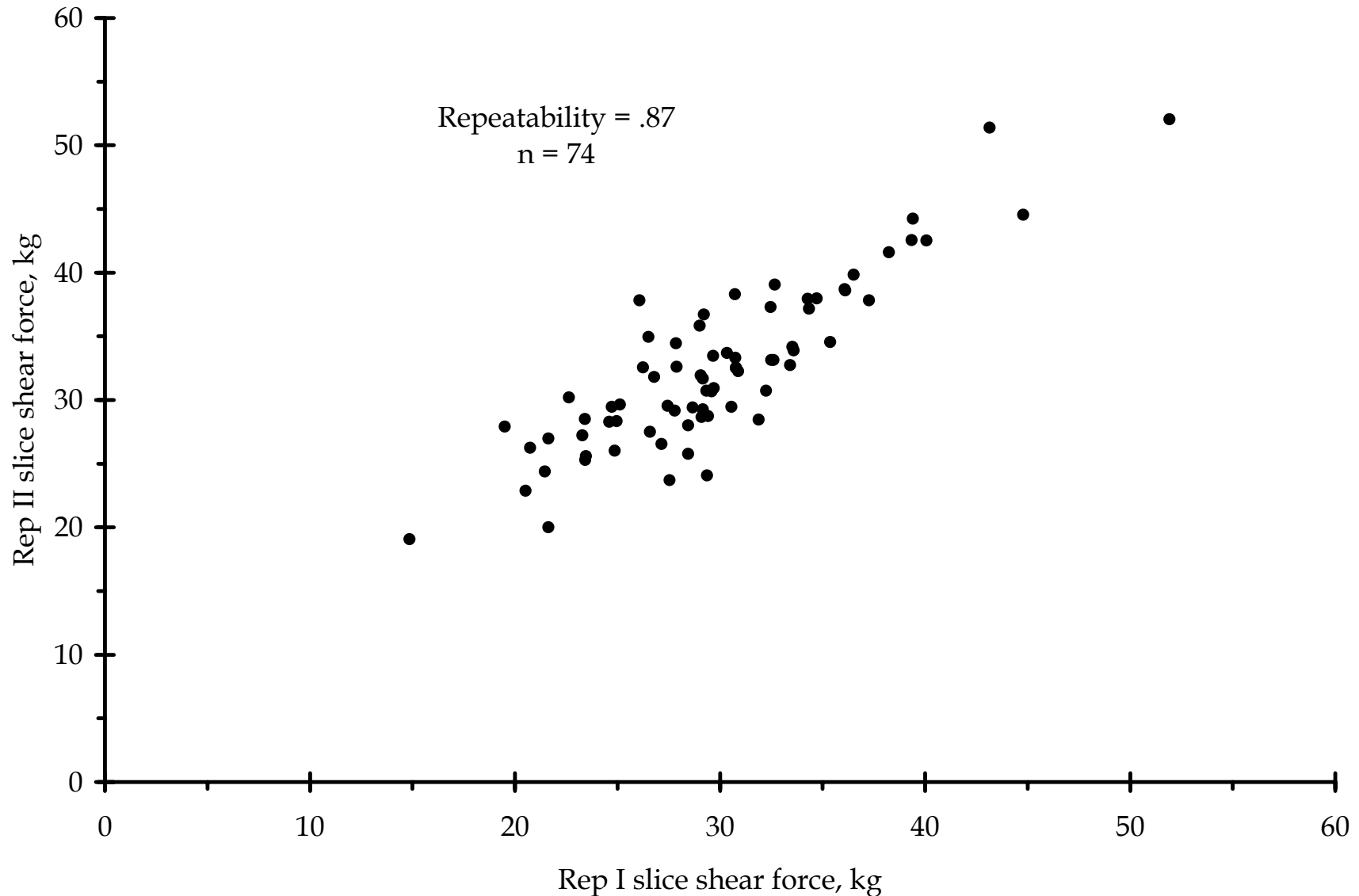
Slice shear force



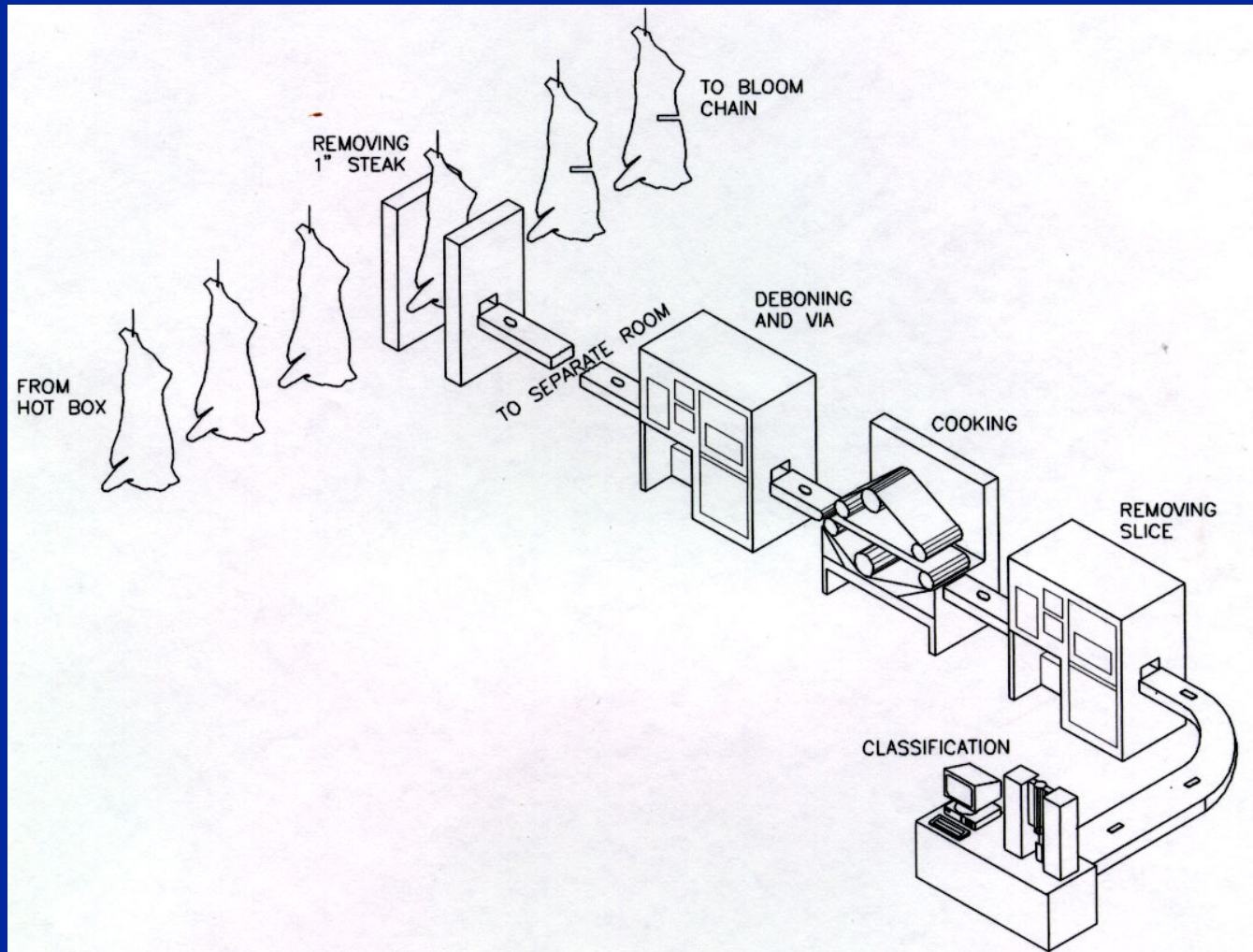
Universal testing machine with 100 kg load cell



Repeatability of slice shear force

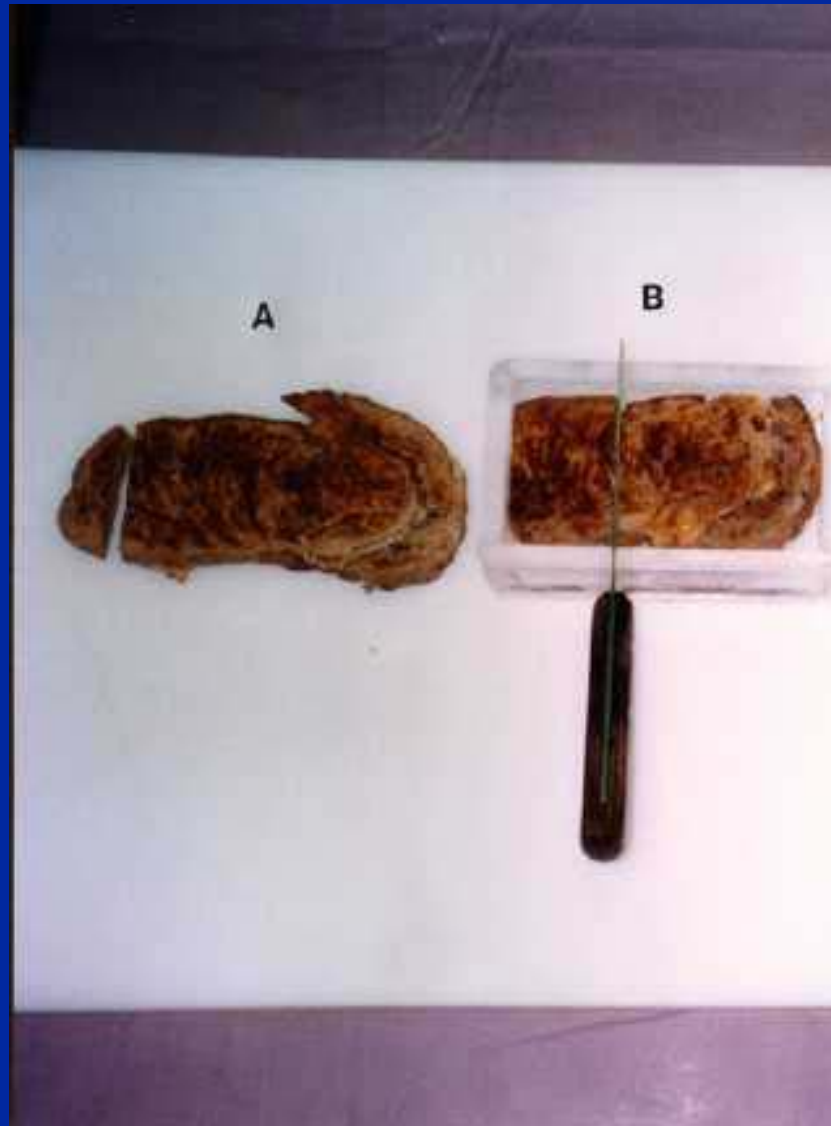


Proposed automated system



Manual method for small scale plants

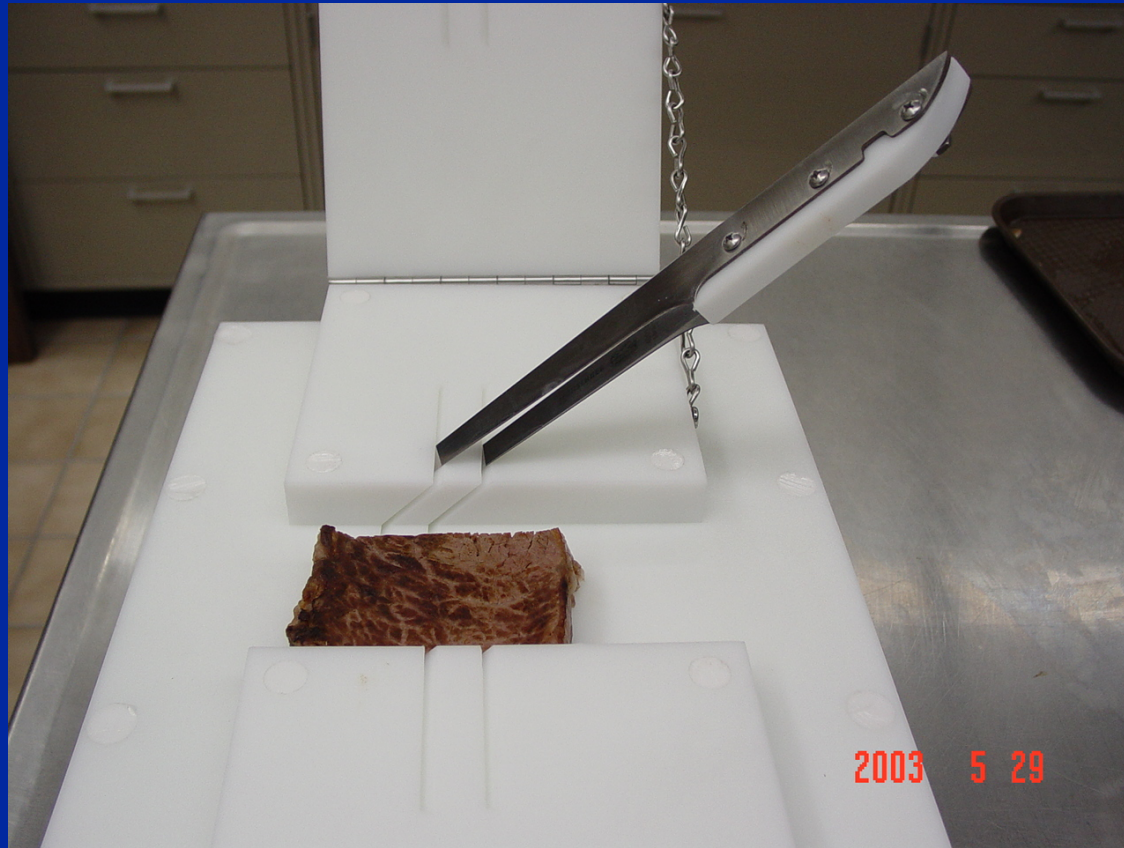
Obtaining 1 cm-thick, 5 cm-long slice



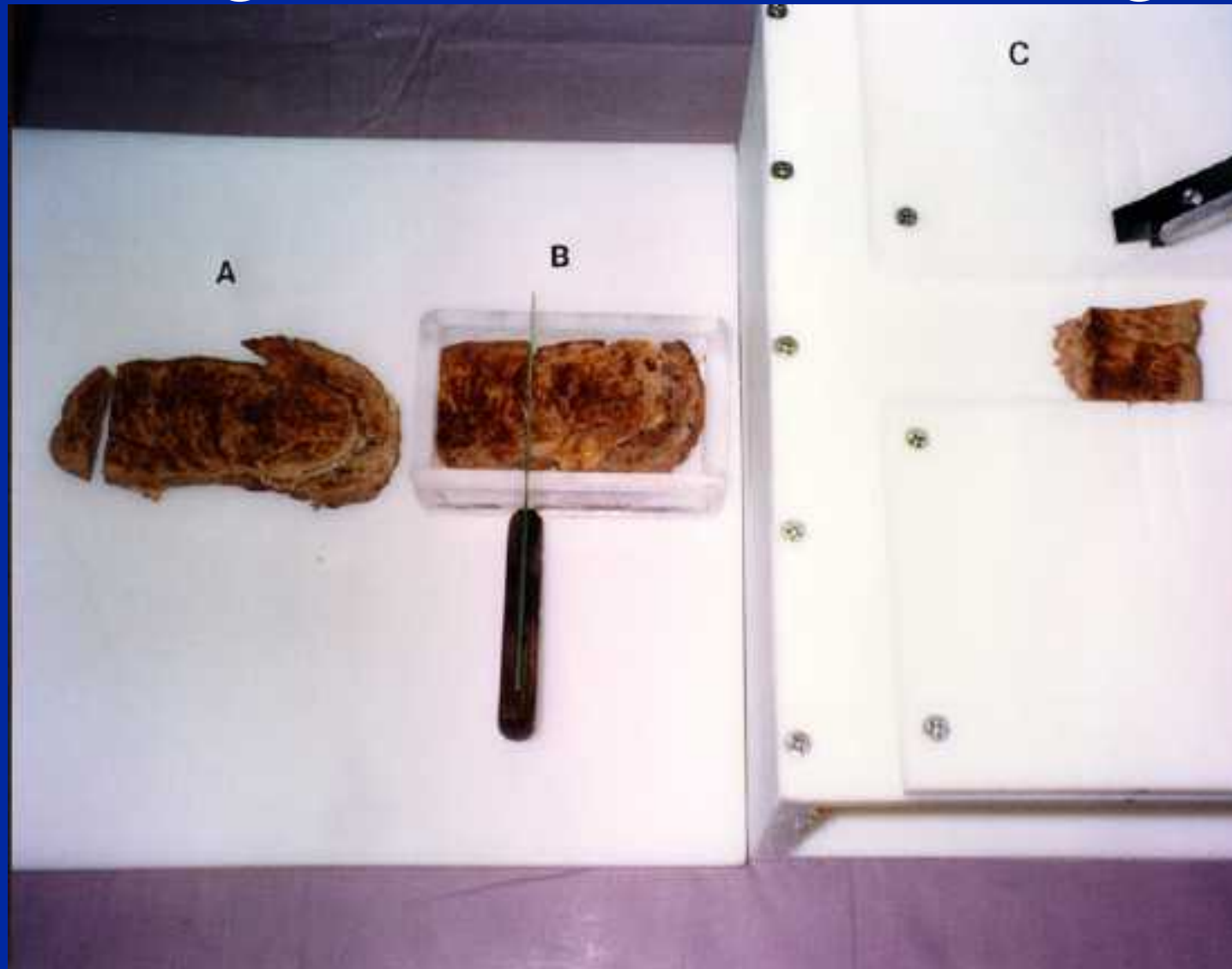
Muscle fiber orientation in slice box



Slice box and double bladed knife



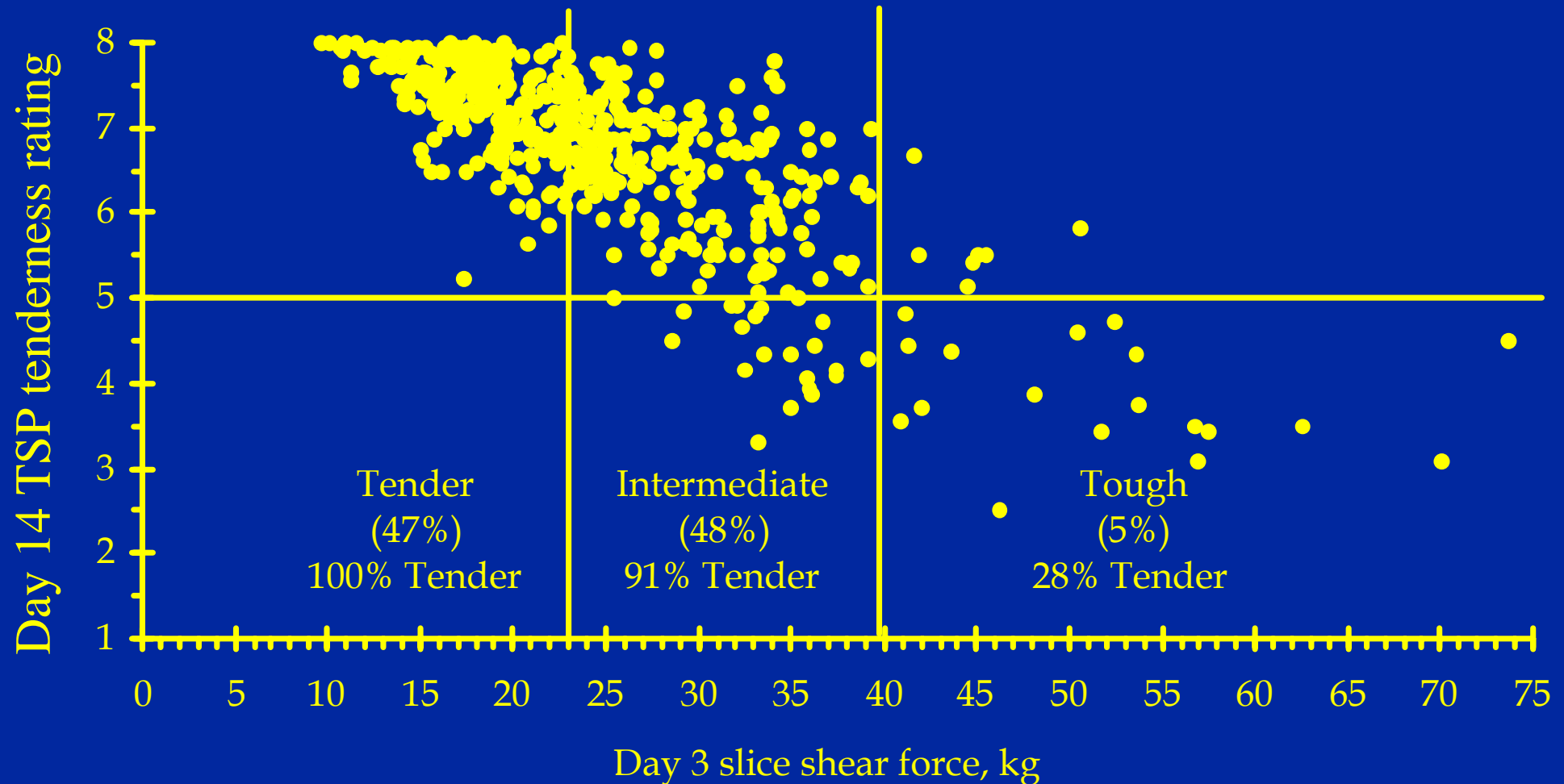
Obtaining 1 cm-thick, 5 cm-long slice



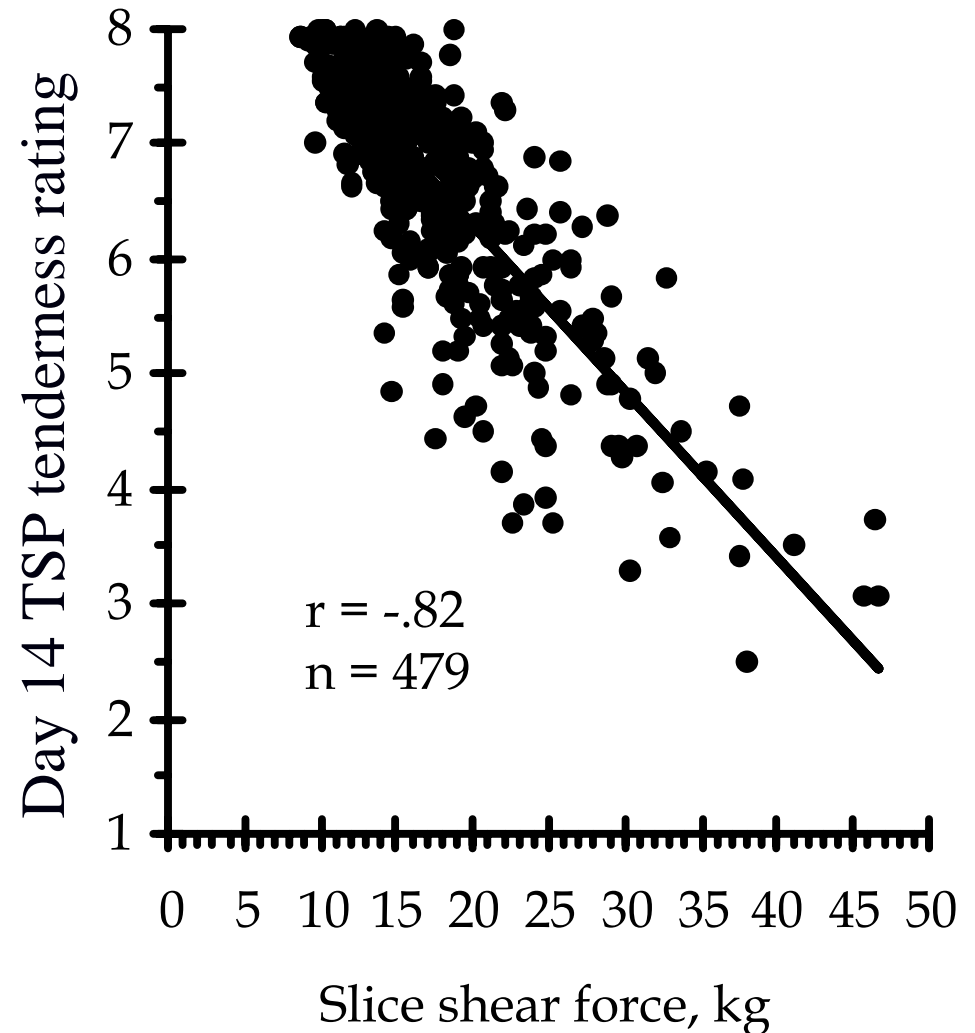
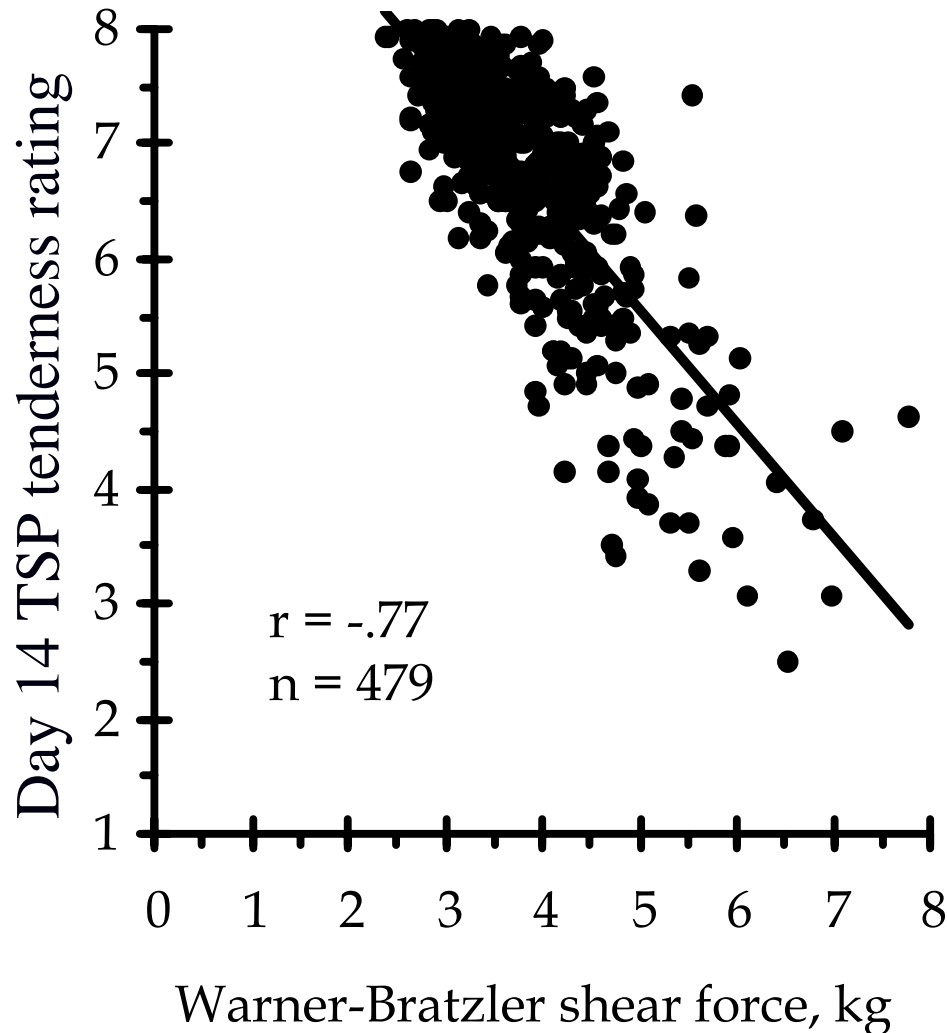
Slice shear force



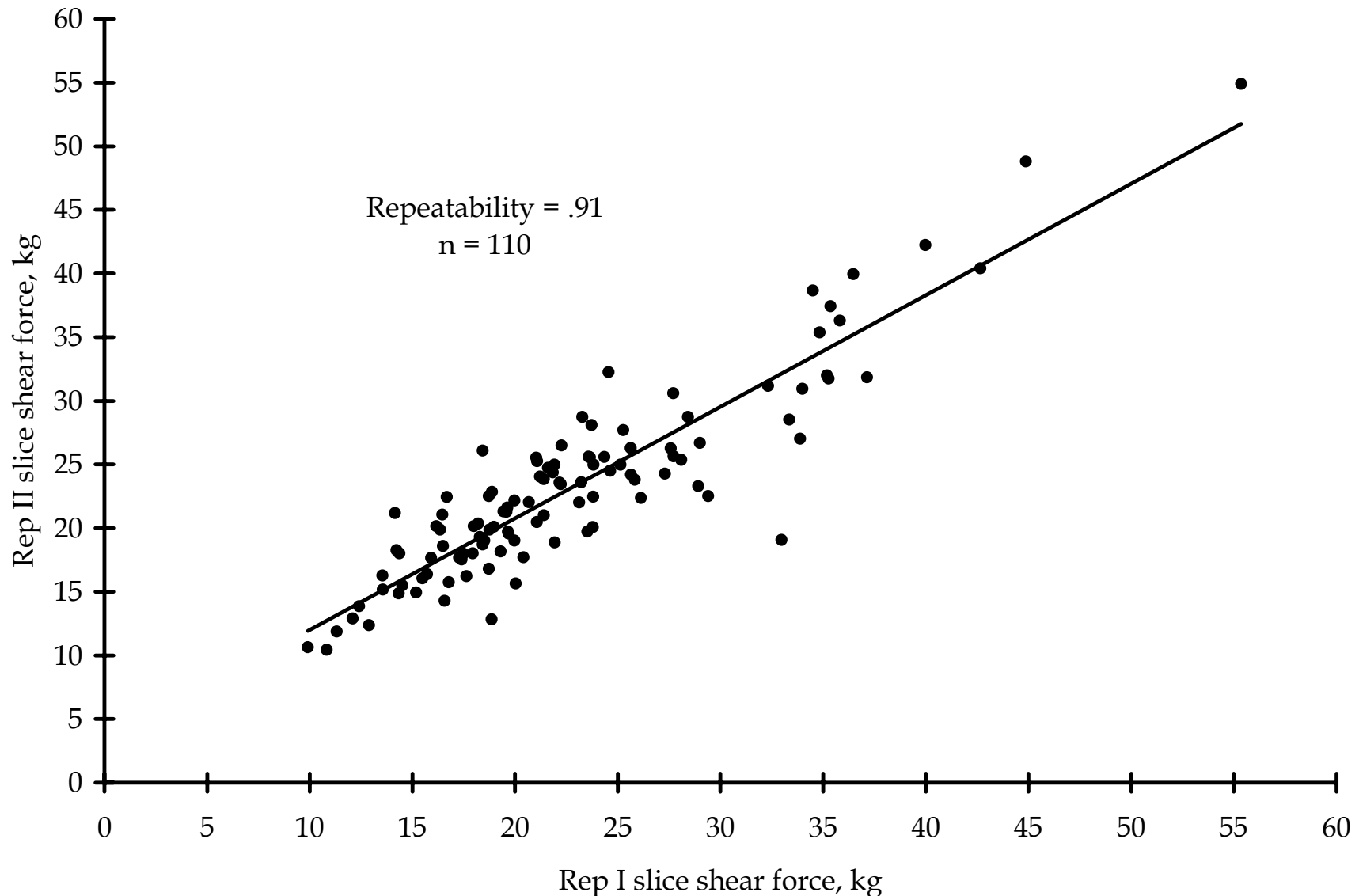
Overall success = 94.4%, n = 483



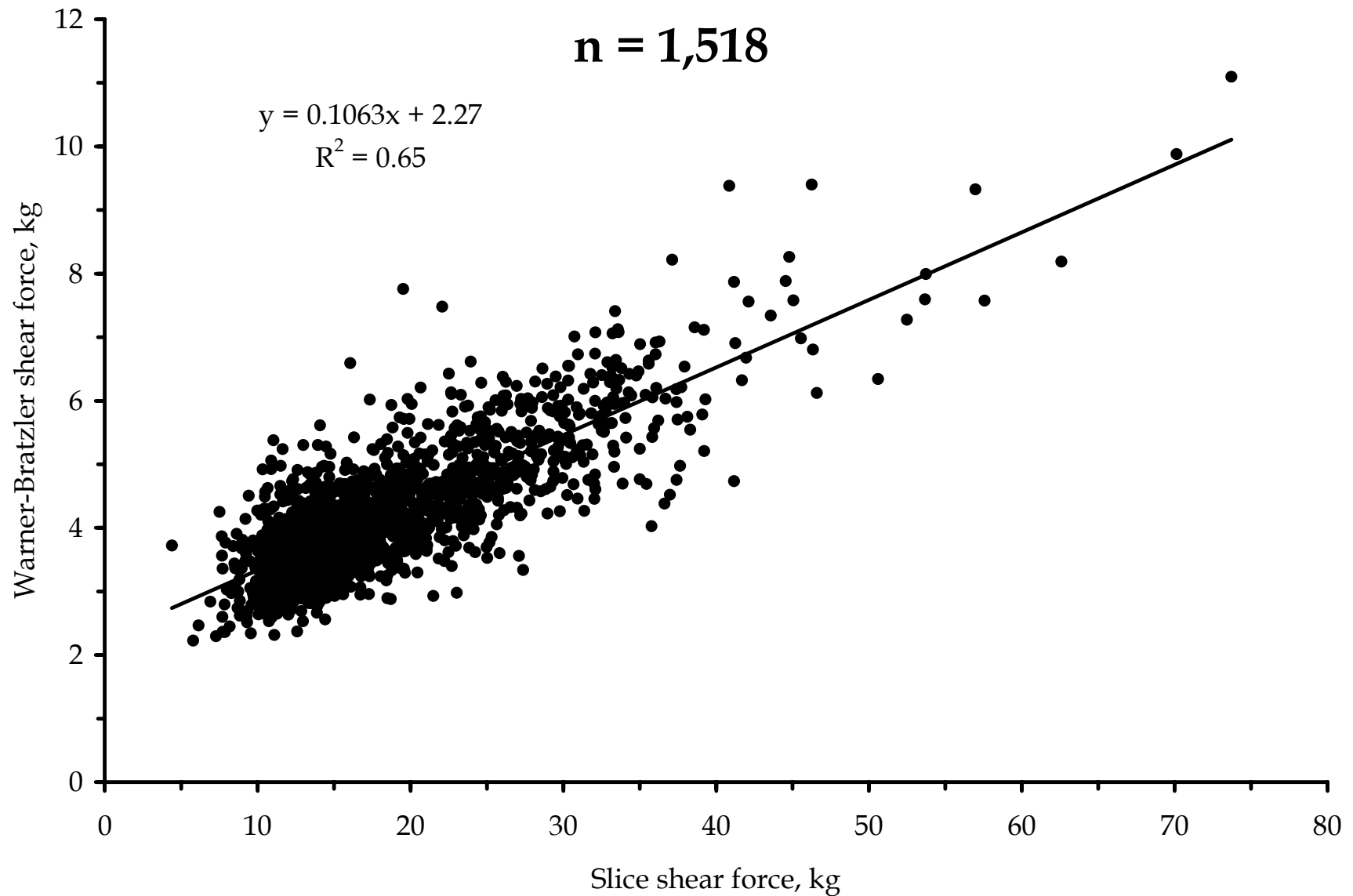
Correlation of WBSF and SSF with SPT



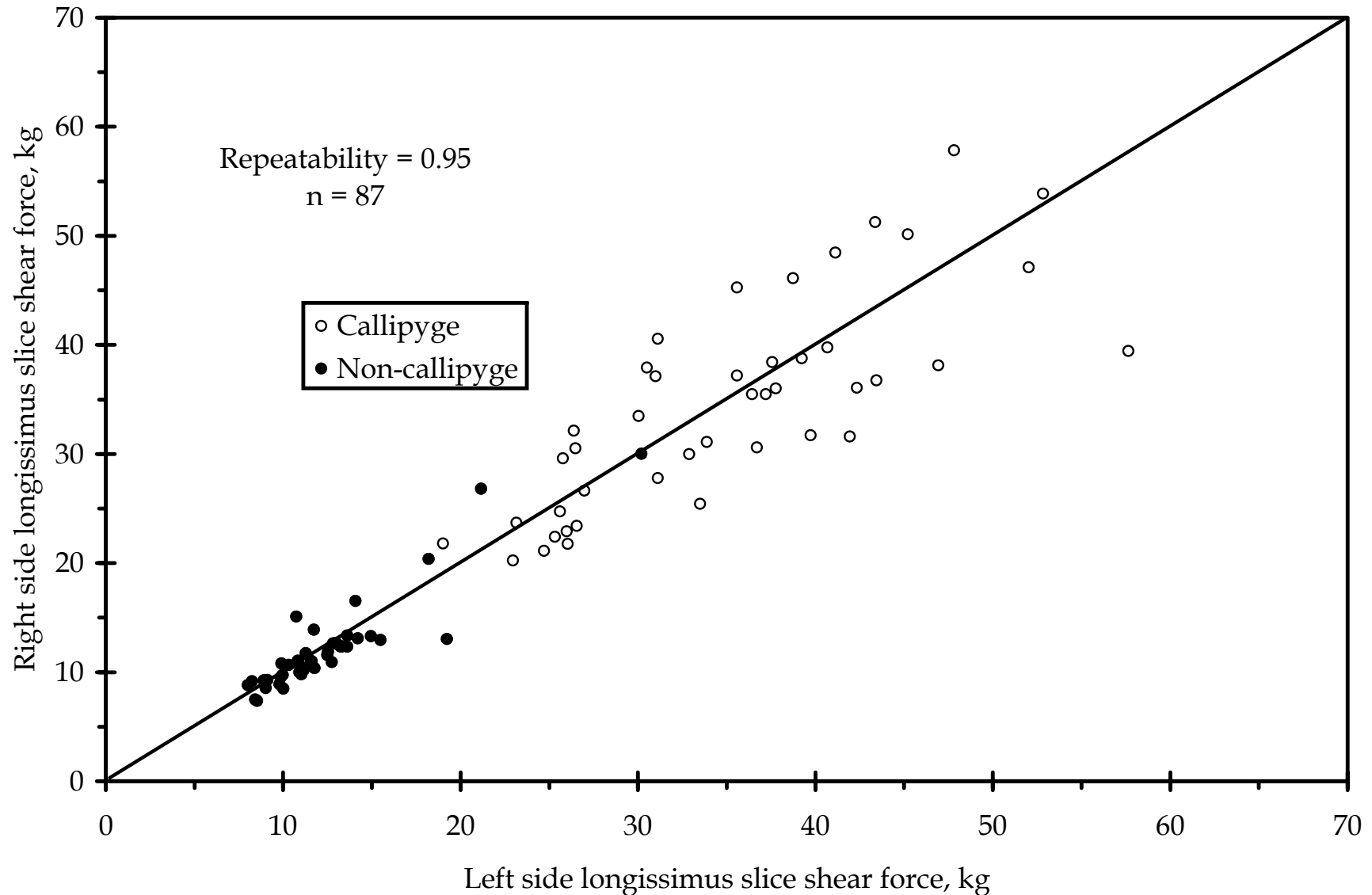
Repeatability of slice shear force for beef

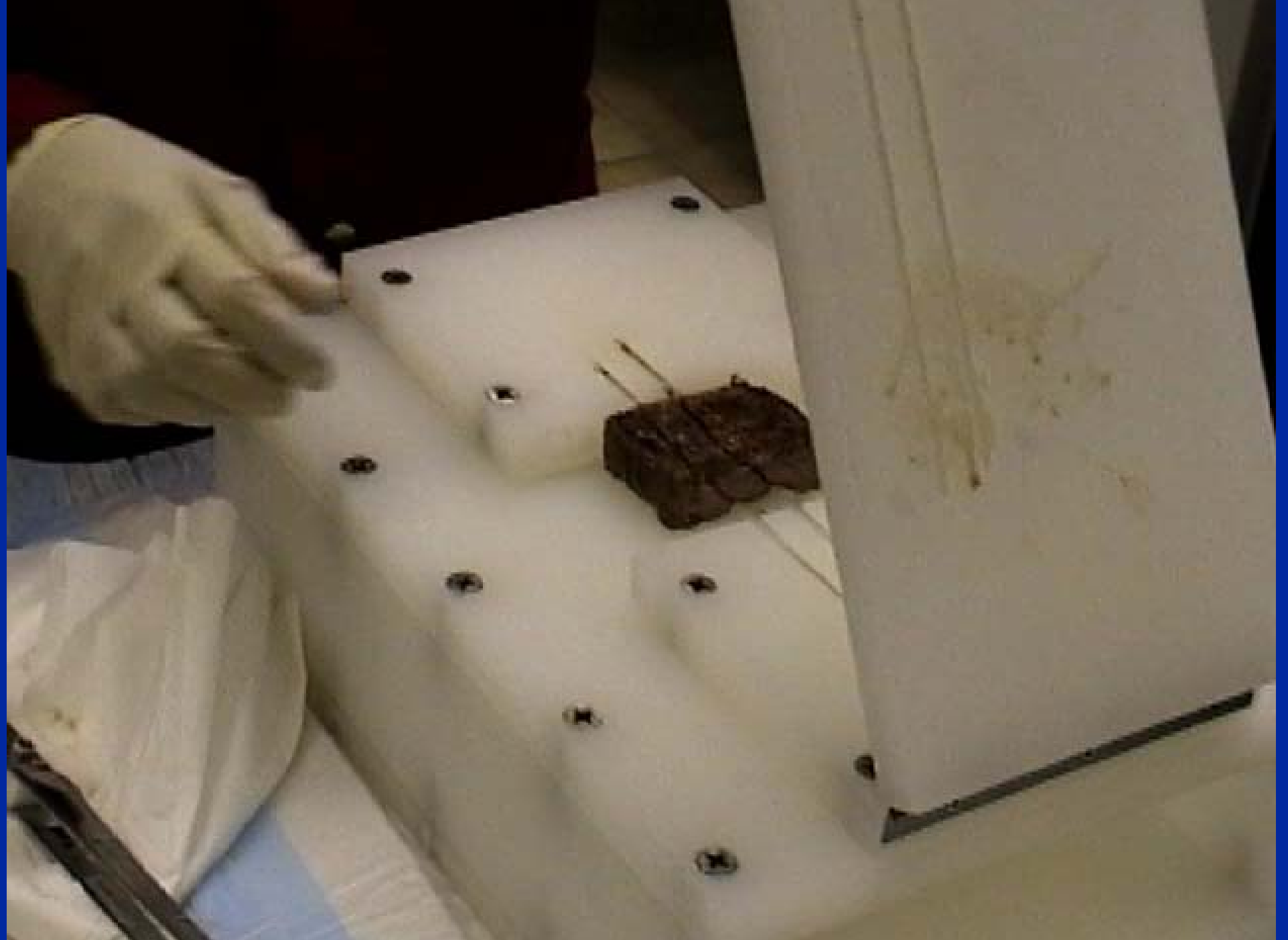


Conversion of SSF to WBS

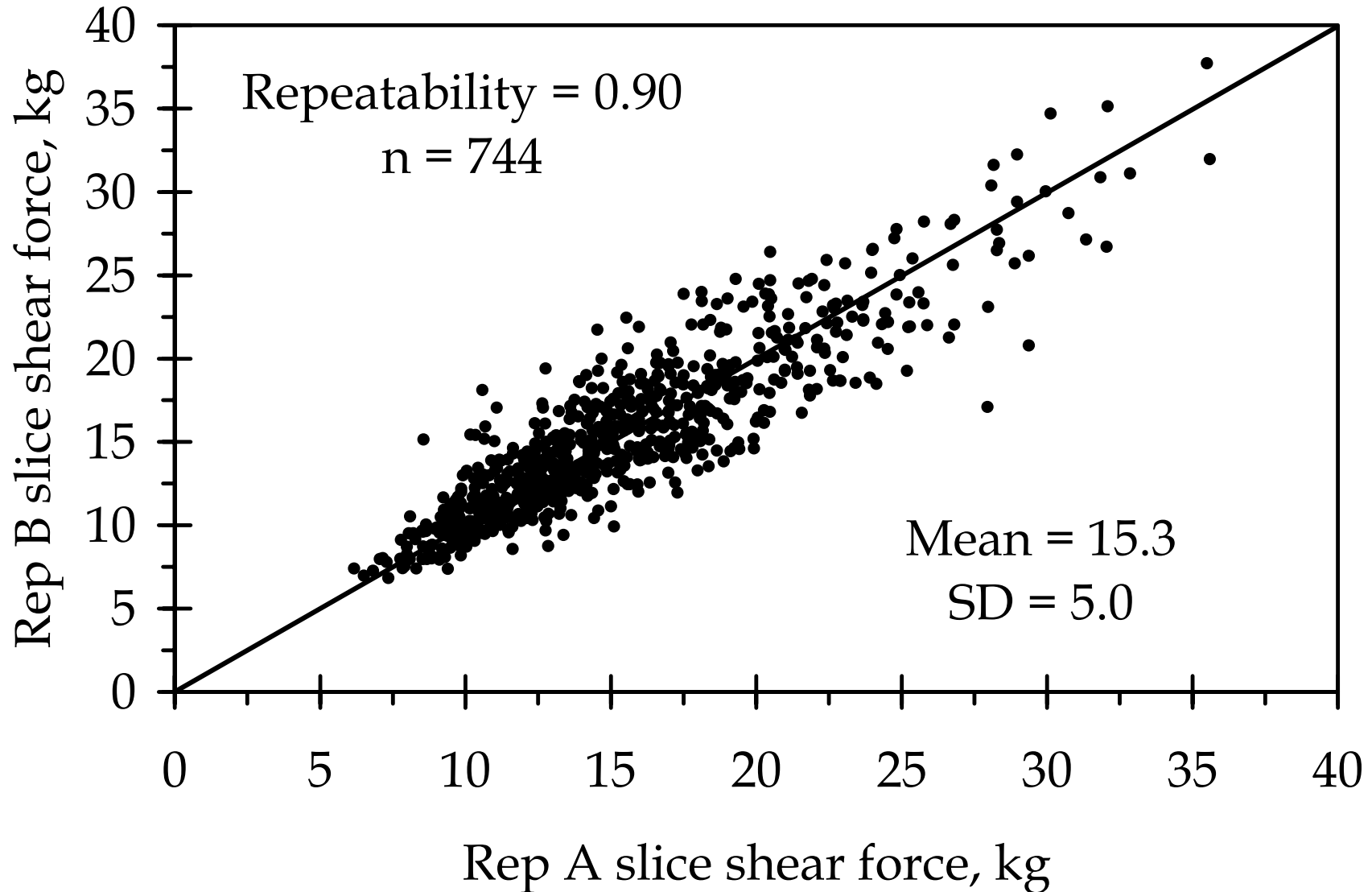


Repeatability of slice shear force for lamb





Repeatability of slice shear force for pork



BEEF

update

Meeting Summary

NATIONAL BEEF INSTRUMENT ASSESSMENT PLAN II

Focus on Tenderness

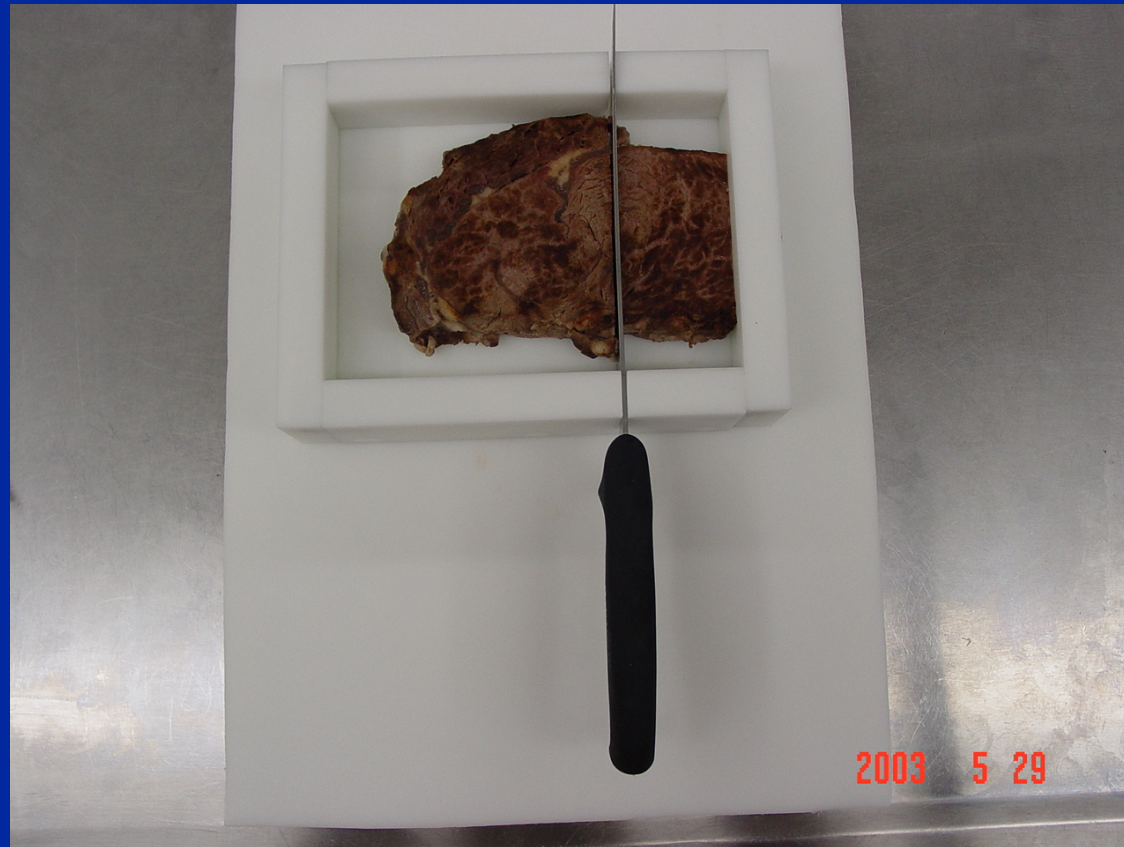
Summary

- Consumers can detect differences in beef tenderness and some consumers are willing to pay a premium for guaranteed tender beef.
- Industry needs to begin implementing Slice Shear Force in as many plants as possible to get baseline tenderness data so that sources of variation and approaches for improving tenderness consistency can be identified.
- Development of non-invasive approaches for tenderness prediction should continue.
- The contribution of many factors to tenderness variation are still not clear.
- Slice Shear Force at 14 days postmortem should be adopted as the end point measurement of tenderness.

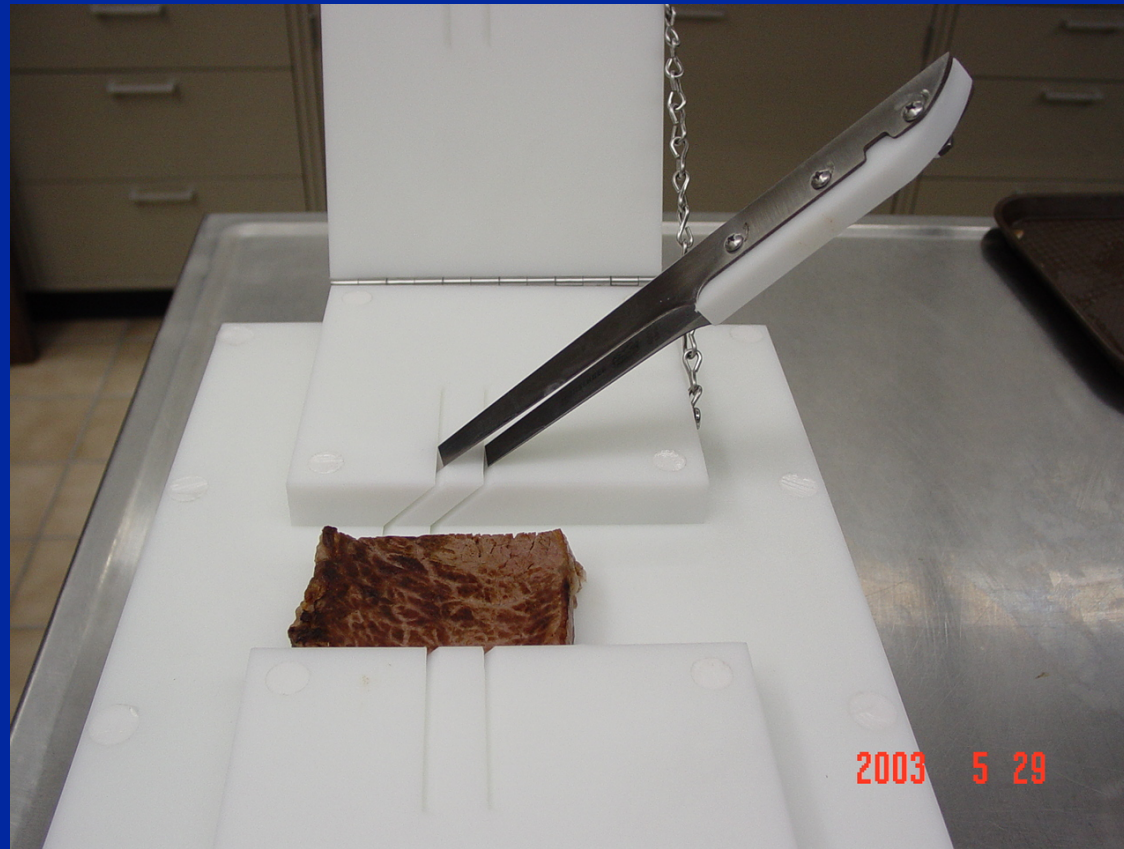
Standardized equipment

- To help insure consistency across institutions
- Available from Gessford Machine Shop, Hastings, NE

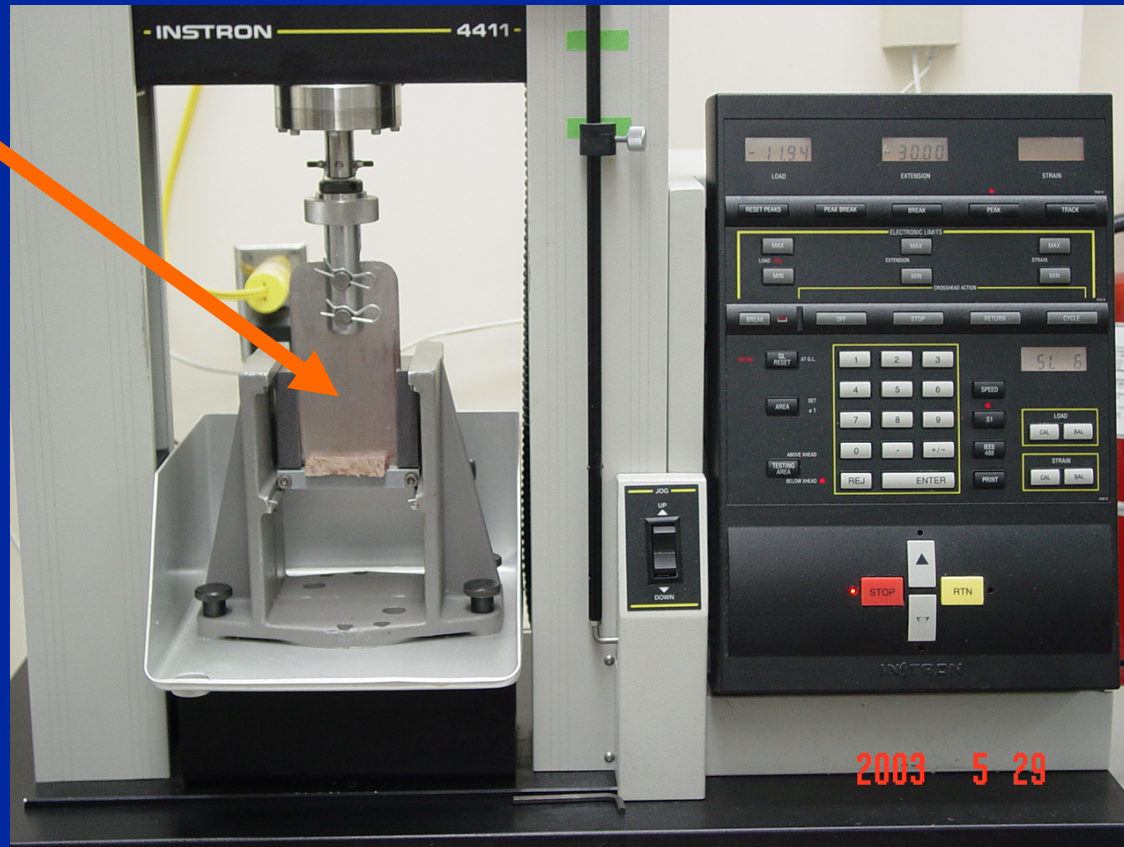
Sample sizing box



Slice box and double bladed knife



Slice blade



Papers and protocols available at
<http://meats.marc.usda.gov>

